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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 6 December, 1904 No. 72

ALGAE OF THE FLUME.

FRANK S. COLLINS.

ON September 4th of this year, the writer visited "The Flume" in the Franconia region of New Hampshire. The Flume is one of the well known objects of interest of the mountain region of the state, and many readers of RHODORA are doubtless well acquainted with it; but for the benefit of others it may be well to say that it is a narrow passage, perhaps averaging 15 or 20 feet wide, between perpendicular walls of rock, seeming almost of artificial construction, so straight are the walls, and so even the width. A mountain stream rushes down through it but there is a path all the way; sometimes on a shelf of rock, sometimes on planks fastened to the wall. The depth of the cut, for such it probably is, though cut by natural not by human agency, is so great that direct sunlight can seldom reach anything but the uppermost part, and the moisture trickling from above combines with spray from the stream to make an ideal region for algae.

Nearly everywhere the wall is covered with a dark reddish brown coating; specimens of this taken at different points showed that it was practically the same throughout, four species of algae being found in all the specimens, though varying in relative abundance. Every here and there on this coating were found masses of translucent gelatine, colorless, or pale greenish or yellowish; these also seemed to be of uniform character, seven species being found in each specimen examined, but in varying proportions. Both the brownish coating and the gelatine were more abundunt on the southwestern wall than on the northeastern, plainly on account of the smaller amount of light to which the former was exposed. The species composing the brown coating were *Gloeocapsa Magma* (Bréb.) Kütz., giv-

ing the reddish tint; *Stigonema minutum* (Ag.) Hass., *S. hormoides* (Kütz.) Born. & Flah., and *Scytonema ocellatum* (Dillw.) Thuret. *Stigonema hormoides* occurred also in the gelatine, but not the other three species just named; and besides the *Stigonema*, there were *Aphanothece microscopica* Näg., *Plectonema Nostocorum* Bornet, *Calothrix fusca* (Kütz.) Born. & Flah., *Gloeocystis rupestris* (Lyng.) Rab., *G. vesiculosa* Näg., and *Mesotaenium Braunii* DeBy.

Before the mouth of the Flume proper, the stream flows rapidly over a smooth, sloping rock, in the form of a thin sheet rather than a stream in the ordinary sense. All through this sheet were scattered tufts of a bright green filamentous alga which, on subsequent examination, seemed to be a species of *Zygnema*, with filaments 25–28 μ diameter. No fruit being found, specific determination was out of the question. Zygnemas are found in ponds and still waters generally, often forming large loose masses near the bottom where the water is not very deep. The present habitat is certainly an unusual one, and the smooth, unbranched filaments would seem little suited to holding on to the smooth rock.

As an adaptation there had been developed short rhizoidal projections, much in the same way as the *forma polyrhizum* of *Rhizoclonium riparium* (Roth) Harv. attaches itself to surf beaten rocks, while the *forma implexum*, with perfectly simple filaments, is at home in quiet bays, lagoons and ditches. It is curious to note that another marine *Rhizoclonium* of our coast, *R. tortuosum* Kütz., though without rhizoids, resists being swept away by the waves, by means of its densely crisped and twisted fronds, which entangle it with any algae with which it may come in contact.

Beside the species mentioned, there were found on the walls of the Flume, the thin black sheets of *Schizothrix Muelleri* Näg. and in quieter parts of the stream, *Phormidium Retzii* (Ag.) Gomont; on rocks just outside the Flume, *Stigonema mamillosum* Ag.

The only reference heretofore to the algae of this locality that the writer has been able to find, is by Prof. Farlow in Appalachia, Vol. III, p. 232, 1884; the conditions of his visit were unfavorable, and he reports only five species; *Synechococcus aeruginosus* Näg., *Nostoc rupestre* Kütz., *N. muscorum* Ag., *Stigonema ocellatum* (Dillw.) Thuret and *Trentepohlia aurea* (L.) Mart. It is interesting to note that none of these were observed at the present visit. This would seem to imply either that there was more variety at different places along

the wall than was detected by the writer; or that the species occurring here varied from one year to another. In either case, it is probable that a student spending some days here might considerably extend the list.

Malden, Massachusetts.

SCIRPUS VALIDUS AND ALLIES IN THE CHAMPLAIN VALLEY.

Ezra Brainerd.

The lucid account of *Scirpus validus* and its two allied species, presented in the April number of Rhodora by Mrs. Agnes Chase, has doubtless led many students of Botany to examine these plants in the field during the past season. The statement that *S. heterochaetus* had been found in New England only at Milton, Vermont, and the fact that *S. occidentalis* had not been seen from Vermont at all, were additional motives for the examination of the bulrushes, that were known to occur abundantly in Lake Champlain. The result of observations at many stations over a stretch of fifty miles is here given.

1. *S. validus* is extremely rare in the waters of the Lake. Only one small colony was seen in a sheltered bay, where it was growing in mucky sand on the border of a marsh. It is, however, abundant along sluggish streams and in small ponds back from the Lake. Its weak stems ill adapt it to withstand the waves of large bodies of water.

2. *S. occidentalis* is the prevailing species in Lake Champlain, covering hundreds of acres. Its strong, pliant stems enable it to grow even in exposed situations. It is found in water, one to three feet deep even in August. This and the matted interwoven condition of the rootstocks make it difficult to secure proper specimens. The plant begins to ripen seeds some six weeks later than does *S. validus*. The "Eastern form," with open panicles, is the usual one in Lake Champlain; but in one colony near Pelot's Bay, North Hero, the spikelets are in congested heads, as figured by Mrs. Chase in Plate 53, cc.

3. *S. heterochaetus* is also common in Lake Champlain, but is found in more sheltered places than *S. occidentalis*. Its stems are much more slender, but equally lithe and strong. A marsh of several acres in Ball's Bay, Ferrisburgh, is almost entirely given up to this species. When I saw it in August the golden fruit was waving in the wind, and it looked like a field of ripened grain. Indeed, I was told by an intelligent camper in this region, that small birds feed extensively on the seeds of these plants in the autumn. *S. heterochaetus* flowers at a date midway between the two other species, and is readily recognized by the color of the spikelets, their ovoid-conical shape, and the three-cleft style.

The pleasure of finding that these two new species were so common in Lake Champlain, was not unmixed with a painful sense of chagrin that for so many years one had been going in and out among these bulrushes without observing their marked specific distinctness.

Middlebury, Vermont.

NEW STATIONS FOR MAINE PLANTS, — II.

Edward B. Chamberlain.

Alnus serrulata, Willd. — In 1898 a large clump of this plant was found in a swamp along the bank of the Pemaquid river in the town of Bristol, Maine. This is the first undoubted station thus far reported from the state, the shrub previously reported as *A. serrulata* being a phase of *A. incana* with rufescent veins. As the locality is two miles or more from any house, and is one that is but rarely visited save for wood cutting in the winter, there seems to be no possibility of the plant having been introduced from farther south.

Antennaria occidentalis, Greene. (*A. Farwellii*, Fernald, not Greene.) — A large patch of this plant was found on a railroad embankment near Cumberland Center, Maine, in 1902, and specimens then collected have been determined by Mr. Fernald. The only other Maine station, at North Berwick, is about forty miles southwest, and has been reported in Rhodora, 1: 152.

Desmodium Dillenii, Darlingt. — Specimens are in my herbarium from Chesterville, Franklin Co., and also from Falmouth, Cumberland Co. The Chesterville station represents the extreme northward extension of the species in western Maine.

Ipomœa hederacea, Jacq.— Collected in 1903 on a roadside dump in Falmouth, where it had escaped from nearby dwellings. This is the first report of the plant's occurrence north of Massachusetts.

Ipomœa purpurea, Lam.— Not unusual on the dumps around Portland, and during the past season spontaneous in vegetable gardens at Cumberland Center. While this plant is not a permanent factor in the state flora, yet its prevalence in cultivation renders it probable that specimens could be found on the waste heaps of most of the large towns in the state, but to my knowledge the plant has not been reported from Maine before.

Oxalis filipes, Small.— Specimens of a peculiar Oxalis were collected in a mowing field in Falmouth in 1903. They were at first determined as *O. stricta*, L., but recently Mr. Fernald has determined them as above. The species is new to the State flora.

Panicum virgatum, L.— An abundance of this species was found by Mr. C. H. Knowlton and the writer at Pine Point, Scarboro, in July, 1903. The plant is of rather southern range in the state, and is not common.

Polygonum tenue, Michx.— In September 1902, while crossing a sandy field at Cumberland Foreside, Miss L. O. Eaton and myself came across a small patch of a plant later determined as *Polygonum tenue*. This is the only station thus far known in the state and forms the basis of the report in RHODORA, 4: 204.

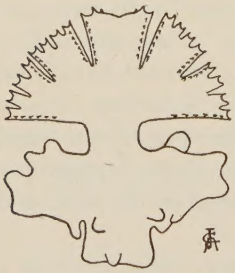
Scirpus sylvaticus, L. — Specimens of this plant, since determined by Mr. Fernald, were collected by Mr. J. Franklin Collins and myself in 1903 near West Falmouth Station in the town of Falmouth. During the past season Dr. D. W. Fellows and I found several plants on Cape Elizabeth near Cape Cottage. Previous reports have not extended its range north of Wells.

Specularia perfoliata, A. DC. — A few plants of this species were found in 1903 at the falls of the Presumpscot river in Falmouth. The plant is of very local distribution in Maine, being known, besides the present station, only from a few points in York Co., and from Mt. Desert Island.

Specimens of all the species mentioned above are in my own herbarium, and with one or two exceptions there are duplicates either in the Gray Herbarium or in the Herbarium of the New England Botanical Club.

WASHINGTON, D. C.

Division in Desmids under Pathologic Conditions.— In looking over certain desmid material during the past summer a character was noticed which to my knowledge has not been called to notice in any published paper. It is a well known fact that the microscopic plants, Desmids, Diatoms, and other small or unicellular algae furnish a considerable amount of the food supply of various small fresh water animals. The effect upon the plant cell in such a case is peculiar. In several cases in material obtained from Reading and South Framingham, Massachusetts, there were also in the bottles various Entomostraca, the two genera bearing upon the matter in hand being Daphnia and Cypris. These small crustacea have bivalve shells which are transparent, allowing the food to be seen after it has entered the digestive tract. It was noted that the change was not always immediately fatal to the Desmid that was swallowed. In a number of cases the cell had not only continued to live but had continued to carry on its division. In such cases, however, instead of the newly formed cells being like the old cells as is the usual condition, they appeared as contorted and bizarre forms quite unlike the old semi-cells. This is of course due in some way to the action of the chemical contents of the digestive tract upon the cells of the plants, thus causing truly pathologic conditions. It was noted in three genera, Cosmarium, Euastrum and Micrasterias, that such conditions occurred. The last, of which a figure is given, furnishes perhaps the best example of deviation from the typical form. The end lobe is fairly typical in its general shape but has an additional small lobe on the face. The lateral lobes are not as well marked, being on one side almost entirely fused, on the other less so. In both cases there are various additional smaller lobes. Altogether, if broken away from the old semi-cells, it would never be taken for a semi-cell of *Micrasterias papillifera*, which it nevertheless is. It would be interesting to determine the sort of form that would be produced if these peculiar cells were to divide again. Some clue as to whether or not these cells would exert an influence on the semi-cells derived from them, might perhaps be obtained from actual experimenting.— Joseph A. Cushman, Boston Society of Natural History.



Some Noteworthy Plants of Maine. — On Sept. 7, 1902, a single root of *Solidago asperula*, Desf., with two or three stems was found within the limits of Portland. Apparently it has not persisted, as the locality was visited last year and again this year, but the plant could not be found.

Centaurea nigra, L., is abundant on Long Island in Casco Bay extending over a large area.

Senecio Jacobaea, L., which Judge Churchill found common on Prince Edward Island and working its way southward through the Provinces (Rhodora, iv, 34), was discovered three years ago in the Deering district, and though still growing freely it does not appear to be spreading.

Coronilla varia, L. I collected this summer at South Freeport, where it is thoroughly established, having overrun an old garden lot and extended to the adjacent roadsides. This is probably the third station for this plant in the State.

Allium tricoccum, Ait., abundant on Eagle Island, Casco Bay.

Veronica Chamaedrys, L., has recently been received from Mr. M. H. Briant, West Buxton, who states that it has been growing freely there in grass land for twelve years or more.

Other plants I mention which have been collected in Portland the present season, are: *Thlaspi arvense*, L., *Sisymbrium Sophia*, L., *Saponaria Vaccaria*, L.

I wish also to report *Juncus oronensis*, Fernald from Allaguash River, northern Aroostook, seen by Mr. Fernald in my herbarium. This, as he suggests, establishes an extension of range for this species. — Dana W. Fellows, Portland, Maine.

An Addition to the Fern-flora of Vermont. — *Botrychium Lunaria*, Sw., is new to the listed flora of Vermont. I found a specimen of it at Willoughby Lake last August. It grew in an upland field, at the foot of a high wooded pasture, which extended back to the cliffs. I was looking for *Ophioglossum vulgatum*, L., which I found in abundance, but nearly all had been decapitated by the scythe. In the same field grew also *Botrychium obliquum*, Muhl., and *B. dissectum*, Spreng. I might mention too *Senecio Robbinsii*, Oakes, as a very common plant growing here and in all the fields and pastures round

about. Amid such environment I discovered *Botrychium Lunaria*, Sw. The top of the fruited frond had been cut off by the mowers, but the sterile frond and all the rest of the fern was in perfect condition. No other specimen was found, but a better time to look for it would doubtless be earlier in the season, previous to the ravages of the scythe and the rake. The fern has been identified by Mr. George E. Davenport. —GEO. H. TILTON, Woburn, Mass.

ERRATA.

Page 21, line 14; for *C. tinctorium* read *G. tinctorium*.
" 23, " 15; " PUBLICATION read PUBLICATIONS.
" 34, " 30; " Greenii *read* Greenei.
" 42, " 19; " of *read* or.
" 57, " 5; " *oblongifolium* read *oblongifolia*.
" 70, " 9; " 1–2 mm. *read* 1–2 m.
" 79, " 30; " Noauk *read* Noank.
" 80, " 10; " BOTRICHIUM read BOTRYCHIUM.
" 91, " 6; " Murdock *read* Murdoch.
" 95, " 2; " *Caulophyceum* read *Caulophyllum*.
" 97, " 42; " corymbosus *read* corymbosa.
" " " 43; " lanceolatus *read* lanceolata.
" 110, " 19; " *Sibericum* read *Sibiricum*.
" 114, " 14; " RHAPONTIUM read RHAPONTICUM.
" 121, " 9; " *cornicula* read *corniculata*.
" 140, " 20; " **Alleghaniensis** read **Allegheniensis**.
" 142, " 25; " **Hedoma** read **Hedeoma**.
" 144, " 1; " MONTANUM read MONTANUS.
" 145, " 27; " *trichomitrion* read *trichomanoides*.
" 151, " 2; " XVII *read* XVI.
" 212, " 2; " *spinulosum*, var. *concordianum* read *spinulosa*, var. *concordiana*.

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